Colco Thunderbird Concept II
User/Operators Manual

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RCE Solutions
Capetown, South Africa

Spares ordering and Questions
Visit: http://www.rchq.co.za

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1 Introduction

Dear Customer.

Thank you for purchase the Thunderbird Colco Concept II Mini RC Helicopter.

For more information about our product, please visit the RC Headquarters on the internet at http://www.rchq.co.za

Online spares can be ordered and Question can be ask, and will be answered by our group of RC Heli pilots.

A Online price list is available and spares can be ordered and will be available within 48 hours after ordering if we have stock.

Enjoy the Thunderbird Mini RC Helicopter

RCE Solutions
Cape Town
South Africa
Cornelis van Rensburg (Crashbandit)

2 Safety Instructions

Read the operation instructions through completely before commissioning. This include important information for correct operation.

We do not take any responsibility for personal injury or damage property caused by incorrect handling or non-observance of the safety instructions!

To maintain this status en ensure safe operation, the user must comply with the safety instructions and warnings contained in these instructions.

Do not leave chargers and connected battery's in operation unattended.

Chargers and accessories should be kept out of reach of children. It's not toys.

Avoid Charging operation under adverse ambient conditions. These can lead to damage to sensitive electronics on the inside of the charger and thus to possible danger for the user. Adverse ambient conditions are:

- Excessive humidity (> 75 % relative, condensing)
- Wetness and dampness, petrol
- Dust or combustible gasses, vapours or solvents
- excessive ambient temperature (> approx ±40°C)

When charging battery's, always observe the charging regulations and the battery manufacturer concerned.

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Never touch the charger with moist or wet hands. There is a risk of a fatal electric shock.

The charger is licensed for operation on main sockets with alternating current in the household 220-230 V ~/50-60hz and in dry rooms.

Remove the battery's from charging devices is not in use.

When operation a Model aircraft, (Heli or Airplane) you are responsible for actions and any consequences.

Remote-controlled model aeroplanes are not toys. For this reason, children and young people should always be supervised by adults when operating.

3 Know your Radio Transmitter

RC Helicopters, come in different modes to fly in. Mode 1 and Mode 2. Personally I think mode 2 is the easiest mode to fly any RC heli in. But that's a personal decision, and the mode that your comfortable with, is the correct mode for you.

Very Important: Always switch on the Radio first and then connect the accumulator (Battery) to

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the Heli. Make sure that the throttle is at 0% speed, (Lowest Position)

Let see the functions of the Channels (Sticks) on the Radio Transmitter

This is a Quick overview of the Functions for each channel on the radio. With the thunderbird, we only use 4 Channels, due to the fact that the TB is a Fixed Pitch Heli. Channels 5 and 6 are not occupied and are not required for flight operation.

Channel 1

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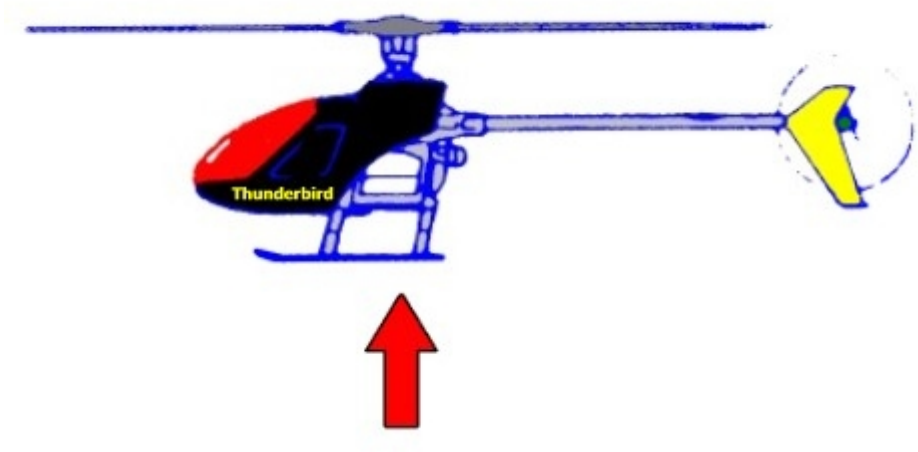
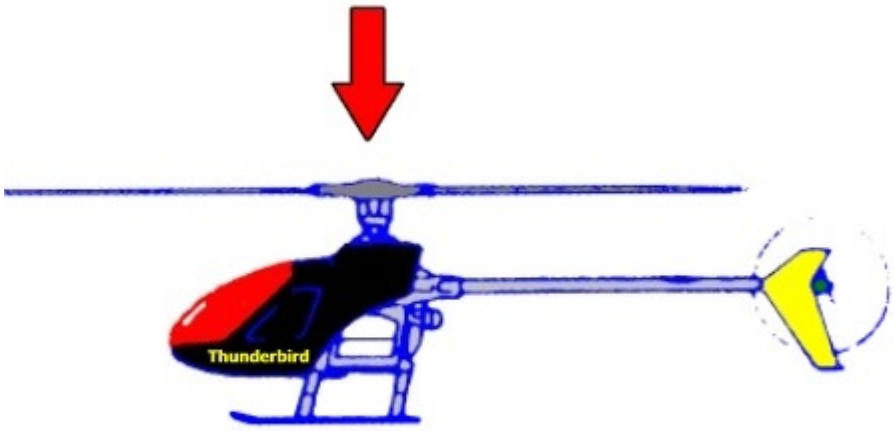


The left hand control aggregate control the rotor speed proportionally in the vertical direction.
This is the only aggregate with a "Snap-in" feature for maintaining the rotor speed during flight.
Lever DOWN: 0% Speed
Lever UP : 100% Speed



Channel 2

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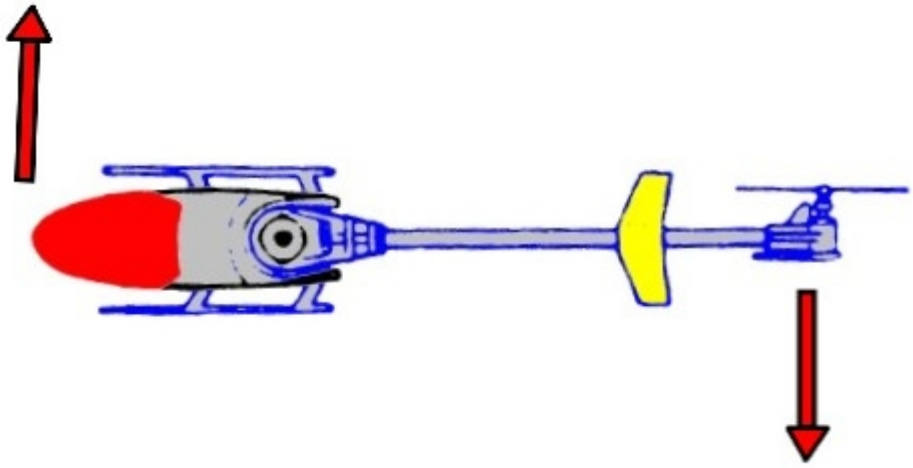
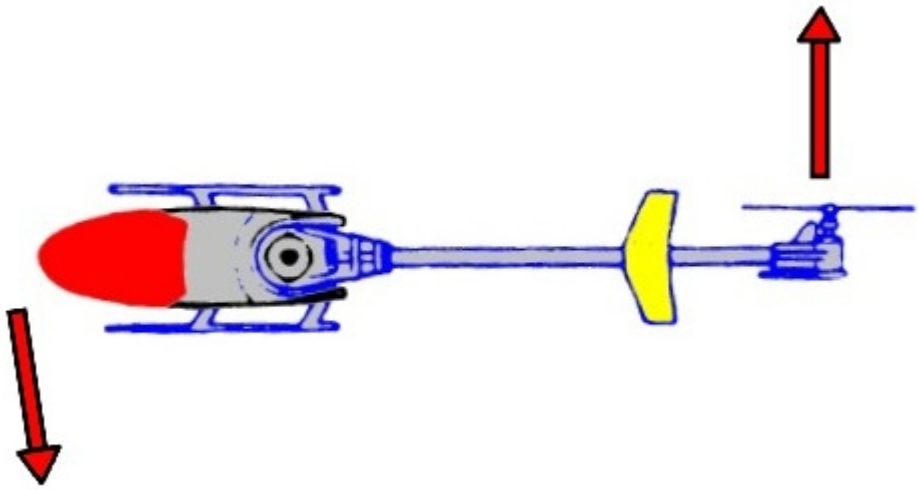


The Left hand Control, controls the "Rudder feature" proportionally in the horizontal position. This feature is necessary to turn the helicopter with the nose in the direction in which you wish to fly. This takes place through the control of the small rear Tail Motor.
Lever to the Left: Nose Left, Tail Right
Lever to the Right: Nose Right, Tail Left



Channel 3

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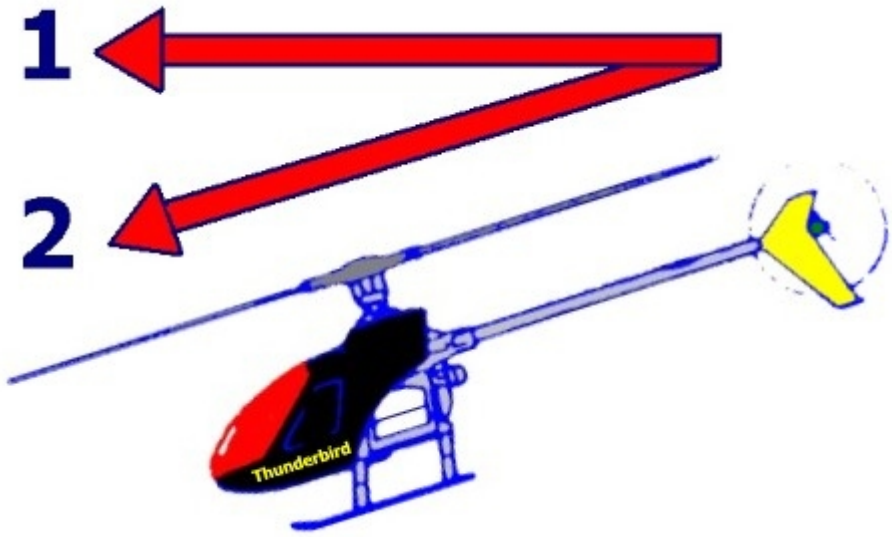
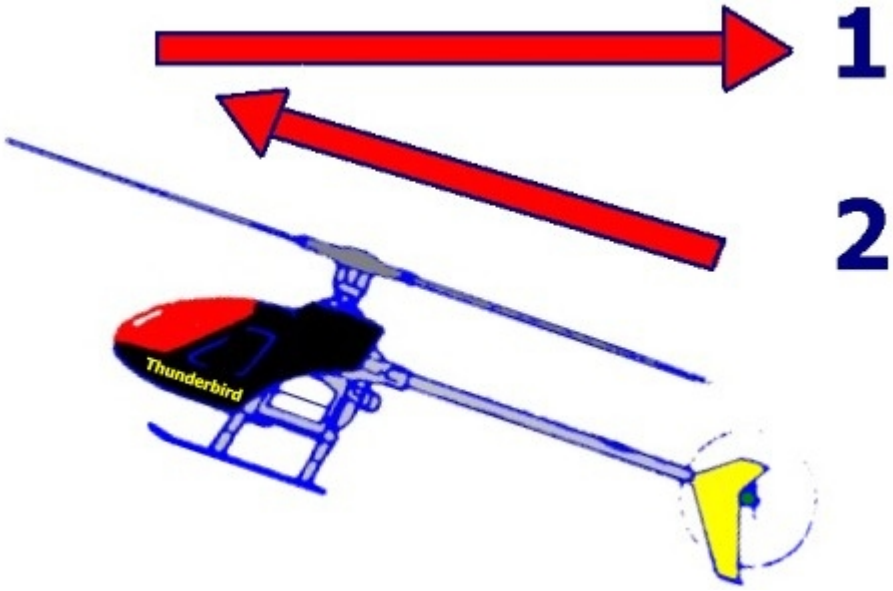


The Right hand Control, controls the "Nick feature" forward/Backwards in the Vertical position.
Lever UP: Helicopter nose Down and Flies forward.
Lever DOWN: Helicopter Nose up and fly Backwards



Channel 4

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The Right Hand Control "Roll Feature" proportionally in the Horizontal position.
This feature is necessary for flying the helicopter side ways. The nose of the Heli still points forwards.
Lever to the Left: Helicopter inclines to the Left
Lever to the Right: Helicopter inclines to the Right.

4 Heli Trim and Pre-Flight Setup

Put the helicopter on a flat level surface

Fit the battery pack.

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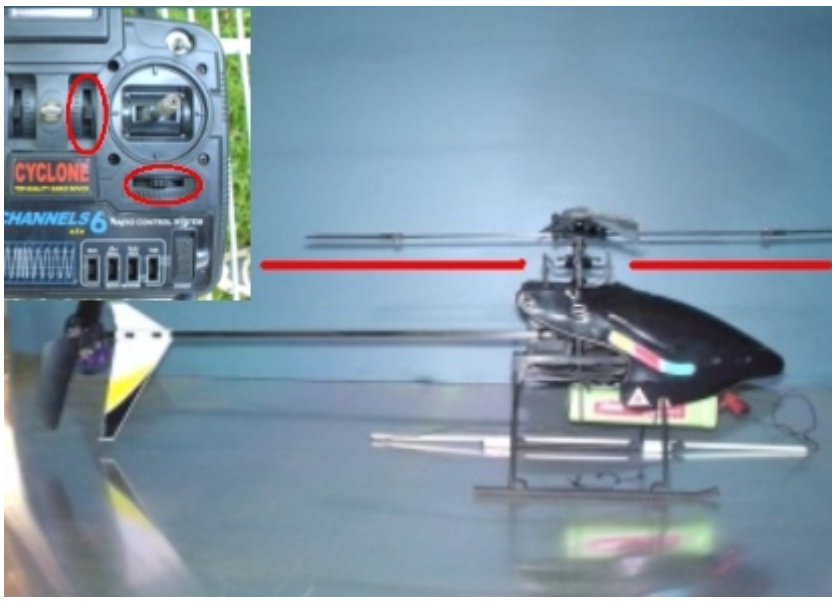
Turn Rotor head so that Blades are horizontal with the tail boom. Put your 2 fingers under the screws that hold the rotor blades and lift the heli off the table.

Adjust the battery position until the heli lifts of evenly. (The Landing gear lifts of level with the table)

Turn on transmitter (ALWAYS FIRST)

Plug in battery

Set the TX trims so that the Swash plate is level.



Make Sure it is level with the surface the heli is on.

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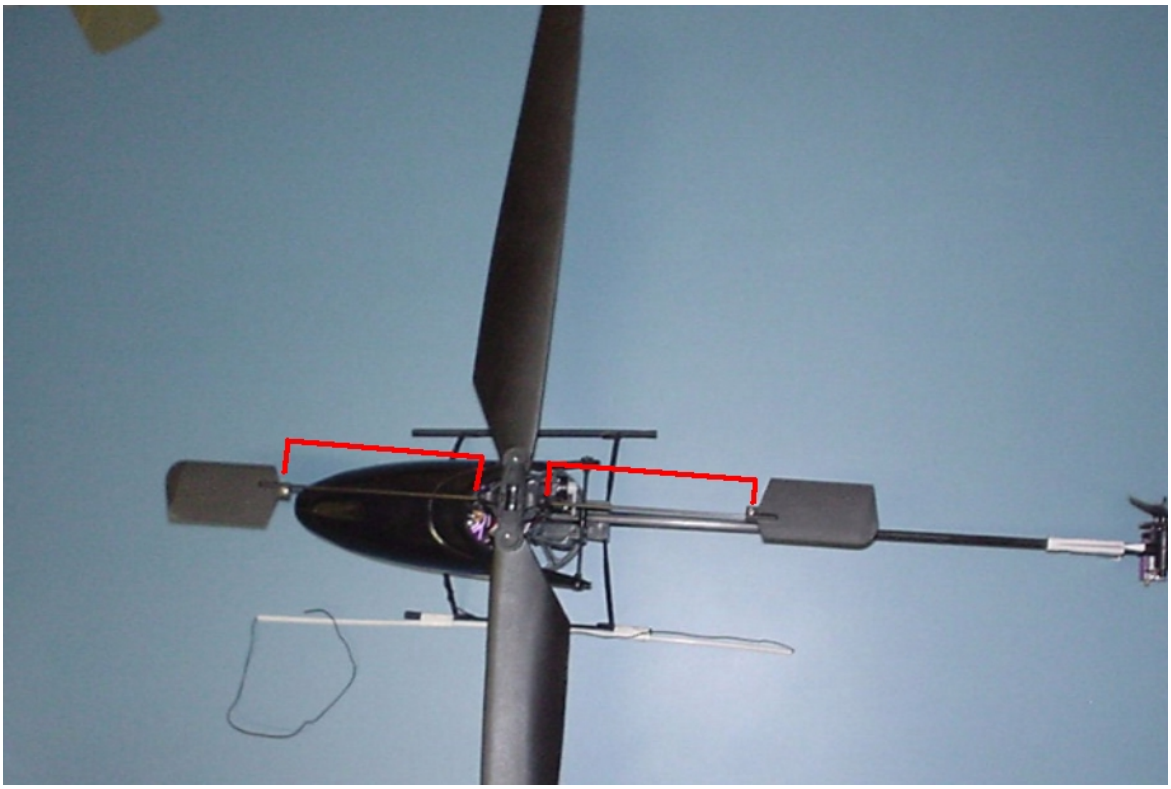
Loosen the screws on the fly bar paddles and align them to be exactly level.

Even a slight up or down angle on the fly bar paddles will affect the flying characteristic

Make sure the fly bar lengths are exactly the same on both sides of the rotor head. Slight length differences
Will cause vibration



Straighten the rotor blades by pulling on their tips and then aligning them 90 deg to the fly bar rod

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Tighten the screws that hold the blades to the rotor head, not too much, just a little, The blades should be able to move but should not fall/slide out of position under their own weight.

If the blades are loose they do right themselves by centrifugal force but I do not like the vibration it causes until they are aligned

Now rotate the whole rotor head assembly by turning the main gear through 360 degrees. Ensure the fly bar paddles remain exactly level through the entire rotation.

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If it does not re-adjust the trims and fly bar paddles until it does.

You might have to redo this a couple of times to get it right.

If all is set up correctly and you let go of the heli, it should hang "reasonably" still in the air.

If the heli does roll or yaw hard it is not set up right and you will never be able to fly it properly. You will be fighting it every second you fly.

5 Adjust the Balance with the Battery

A very important aspect for flying the Thunderbird Helicopter, is to make absolutely sure that the Balance (Also refer to as the CG"Centre of Gravity) is set correctly on the Helicopter. Incorrect Balancing can lead to a few problems when flying. Use the Battery to Adjust the Balance of the Heli.

Set the Main Blades inline with the Tail Rotor Boom.

Lift the Heli in the Middle on the Fly bar beam with one hand.

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The following Picture show that the Balance is to far Back, and need to be adjusted forward. Move the battery forward to make the Heli hangs level. This can lead to a broken Tail rotor as soon as you try to lift up, due to the Heavy weight to the back.

The next picture show the Ideal Balancing of the Helicopter. When holding at the Fly bar beam, the Helicopter hangs horizontal in the Air.

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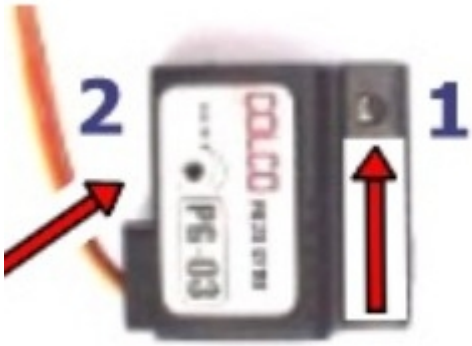
6 Gyro Setting

Adjustment- Centrifugal System.

The helicopter is equipped with a Centrifugal (Gyro) System. This system compensates the rotary movements of the helicopter fuselage which arise through the rotating motor. The Helicopter remains stable in the desired light direction.

This feature has to be adjusted before flying is commenced. Proceed as follows.



- Put the helicopter on a Level open Area.
- Centre the channel 2 Trim slider (Move it to the centre position)
-

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- Connect the Battery to the Helicopter and wait approx 2 seconds. Automatic setup is Carried out.

- Hold the helicopter by the tail boom behind the landing gear.

Increase the throttle and allow the main blades to start rotating at a fair pace where it feels as if it want's to lift off out of your hand.
Check to see that the tail motor starts spinning too.

Feel whether the helicopter is trying to except a sideways force on your hand. If the heli's tail wants to swing anticlockwise, turn the gyro mixing(control 1) screw clockwise.

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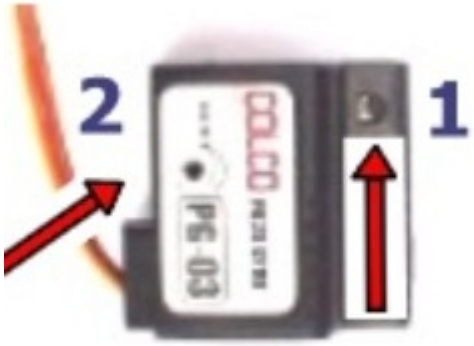

This will increase the speed at which the tail motor spins proportionally to the main rotor and will counter the tail's anti clock wise rotation.

If the tails want's to swing clockwise turn the setup/mixing screw counterclockwise, this will reduce the speed at which the tail rotor spins proportionally to the main rotor.

The idea is to set the speed of the tail rotor just right so that the helicopters tail does not want to rotate in any direction but remains neutral in flight.

If the mixing is not correctly setup the gyro will try to correct the tail too much. This will shorten the life of your tail motor drastically. Take time to get it right.

Now flick the helicopters tail away from you, counter clockwise) The tail rotor should speed up (rev) to try to prevent this movement. The "size" of this "Rev" is determined by the gain (control 2)screw on the gyro. Do not fiddle with this screw, It should be set Ok.
Doing so will also affect the mixing ratio and you will have to start adjusting again from the top of this chapter.

Now Still holding the helicopter, throttle up to hover rpm (the heli wants to fly up out of your hand). Feel again for any Forces exerted on your hand.

If there are no strong forces in the roll or yaw axis and the tail seems to be neutral, briefly let go of the helicopter.
If you have setup your helicopter correctly it will fly (hover) pretty much in the same place you left it. It may however climb upwards, in which case you must reduce the throttle slightly.

7 Service and Cleaning

Clean the Helicopter and Rotor blades after each flight.

Disconnect the battery from the Receiver and ESC.

Check all screw connections for tightness after each flight.

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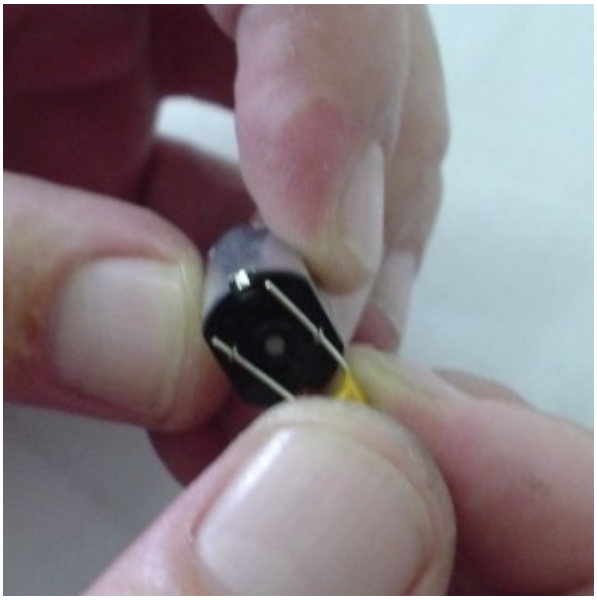
8 Repair Hints & Tips

Tail Rotor Motor and Gears

Here are a Few Images I took, to demonstrate how to assemble the Thunderbird RC Helicopter.



Put the Small Capacitor Legs through the Little hole at the Back of the Tail Rotor Motor.

Screw the Rail Rotor Motor to the Tail Holder.

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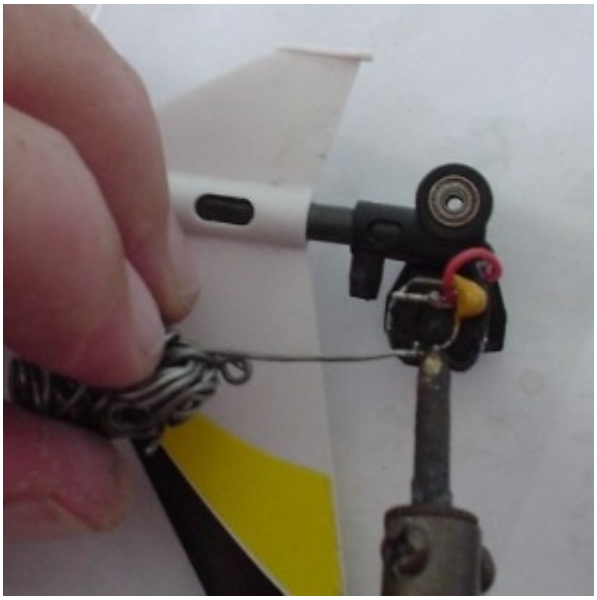
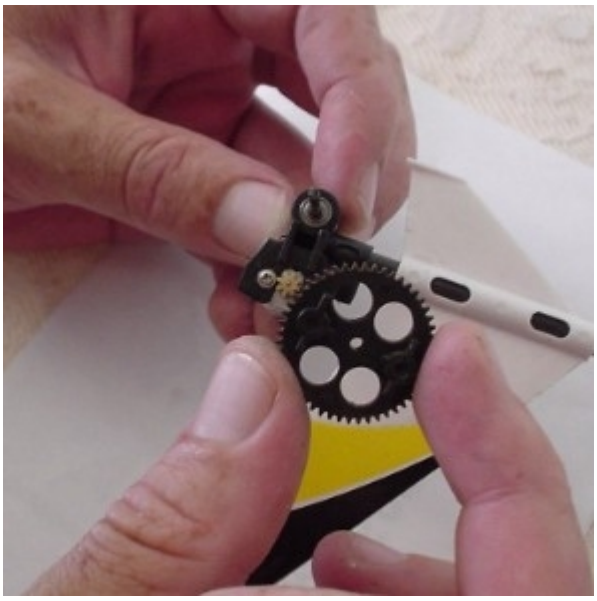


Solder the Wire to the Motor. Please note the Polarity. + (Red wire) - Black Wire.



Add the Tail Rotor Gear to the Tail Fastening Sleeve Spindle.

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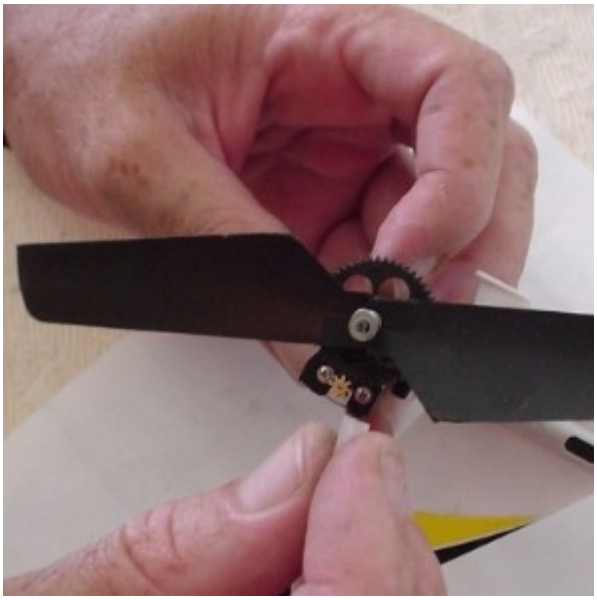
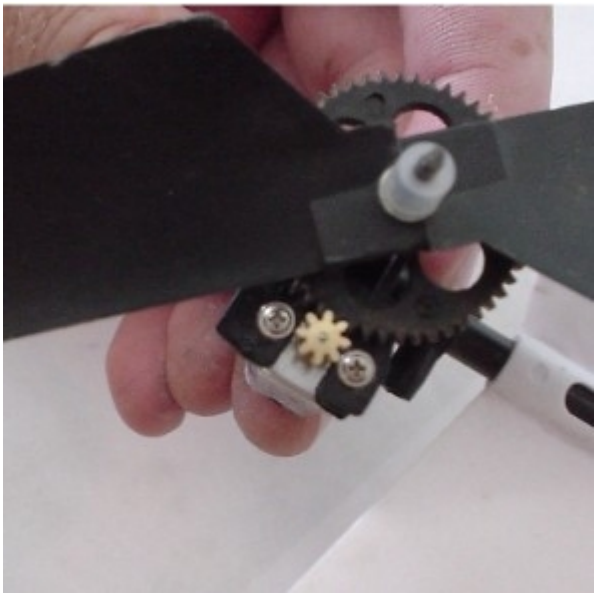


Add the Tail Rotor Blade, Spring, Washer and Plastic Tubbing to the Tail Fastening Spindle.



The Tail Rotor Motor assembly are completed. Please note the Distance between the Motor and the Rotor Gear. Do not tighten to tight. Leave a Little cap between the Motor and the Gear.

SERVOS

Connect the Servo Tie Bars to the Servo Horn.

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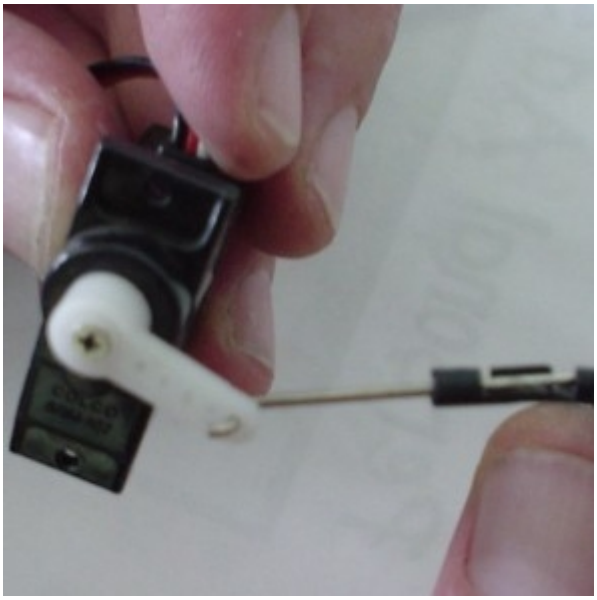

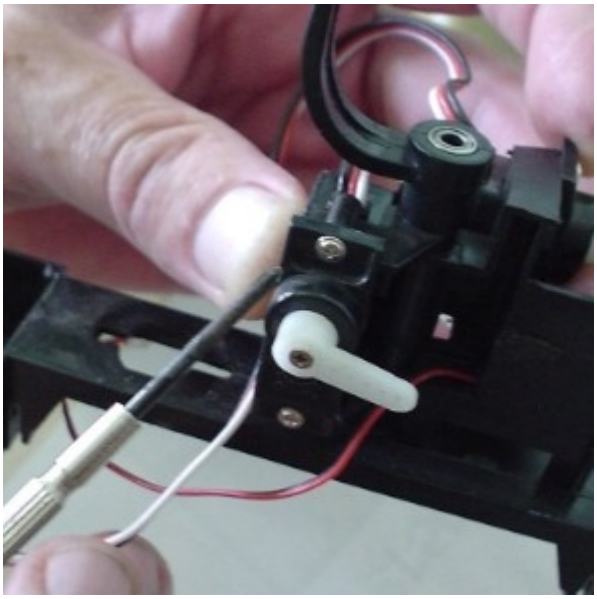

Connect the Servos with the Screw supplied to the Main Frame Servo Holders

Receiver, Speed control and Gyro

Add the Speed Control and Receiver in the PCB Box.

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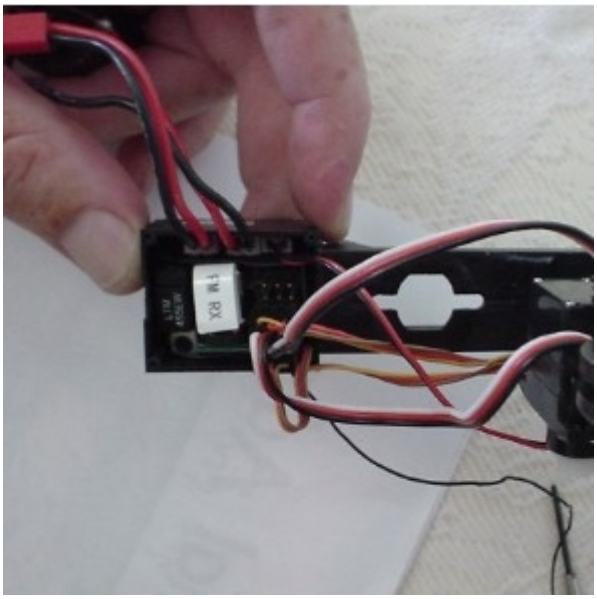

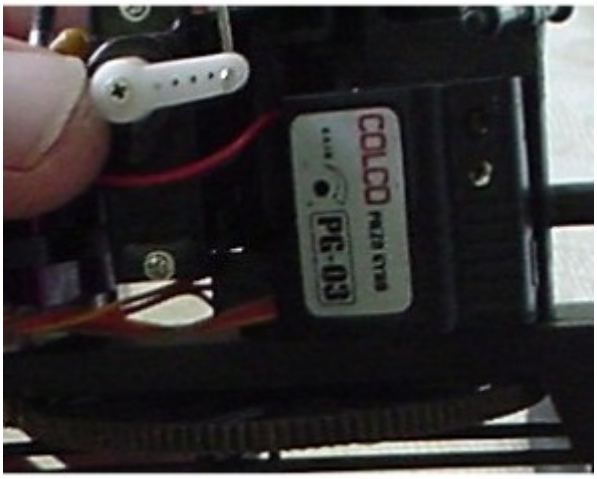

Connection Diagram for the Speed Control Gyro and Receiver is as Follows.

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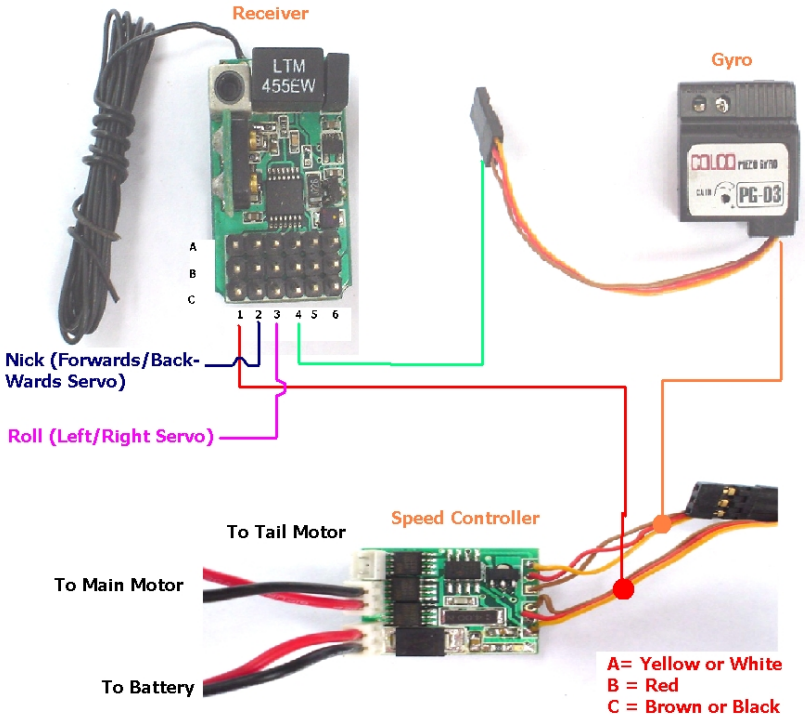
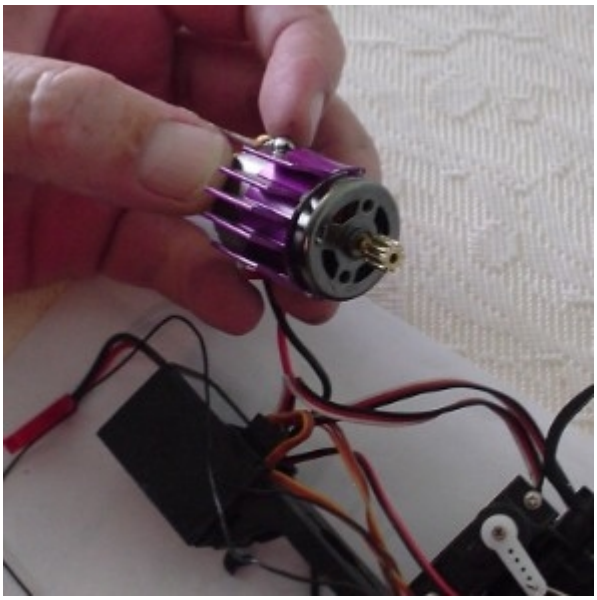


Main Motor & Main Gear



Add the Main Rotor Motor Give Out cove to the Main Motor. Be careful not to put the Cove over the Ventilation Holes on the Motor.

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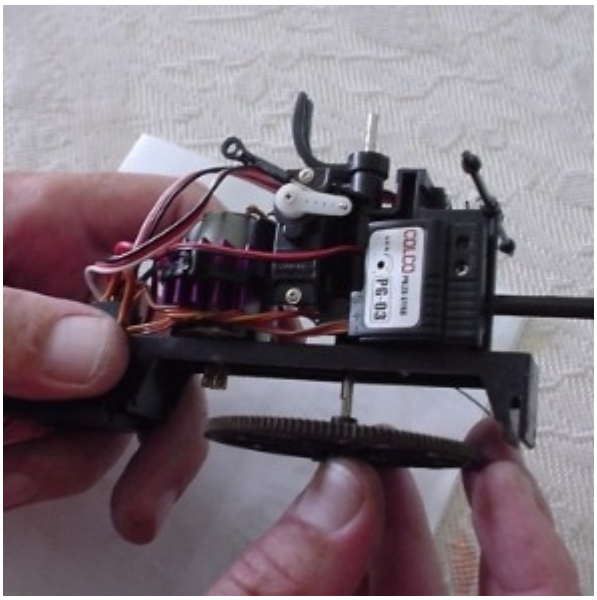
Use the Supplied screws and screw the Main Motor to the Body Frame. Don't tighten them yet, because we need to align the Main Rotor Gear.



Add the Main Shaft to the Main Motor Gear and Press in the Main Frame Body. Please make sure that the Bottom and Top bearings are fitted correctly, before press the shaft through the Main Frame hole.

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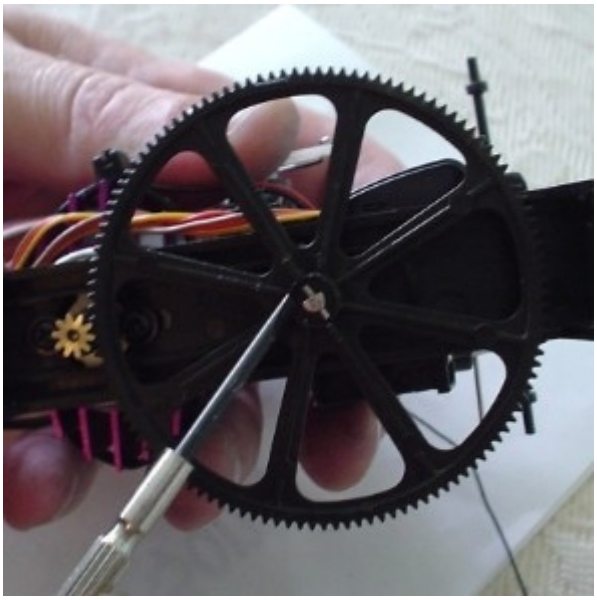

Pay attention to the clip that hold the Main Shaft in place at the Main Gear. I used a Little CA glue, after the pin is securely fitted. Also adjust the Main Motor that the Gear is not running to tight against the Main Gear.

Press the gear to the top and Attach the Sur clip to the Main Shaft.

Head Assembly

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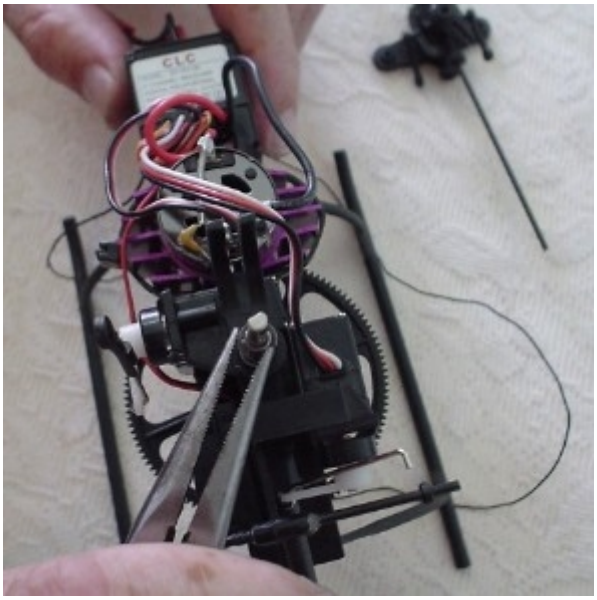
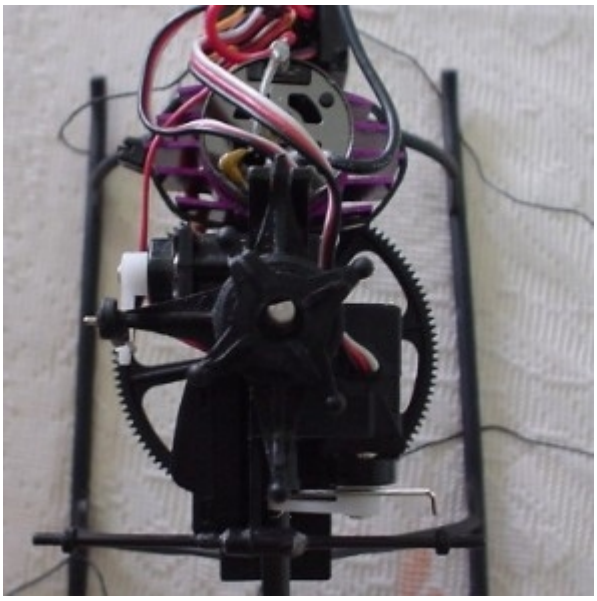


Add the Sir clip to the Main Rotor Shaft



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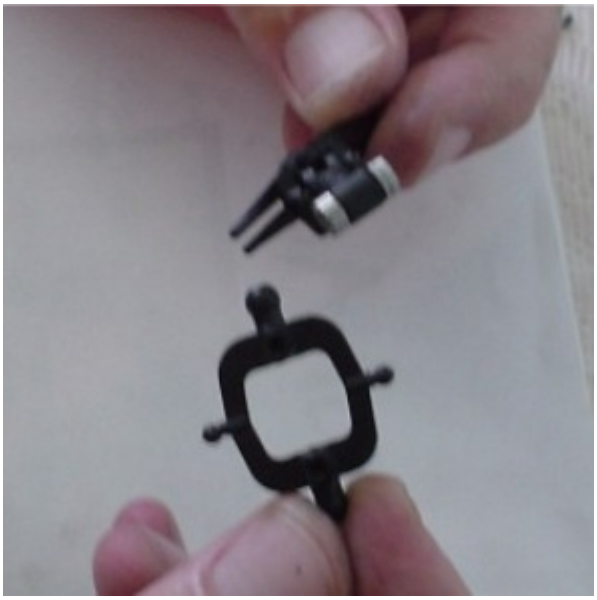

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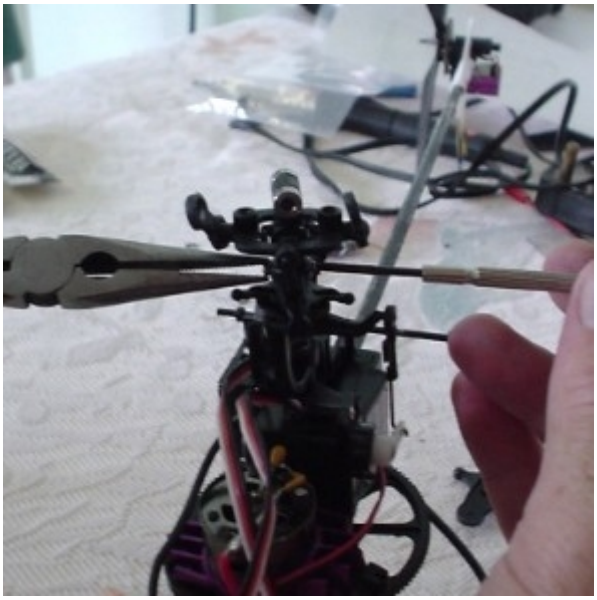

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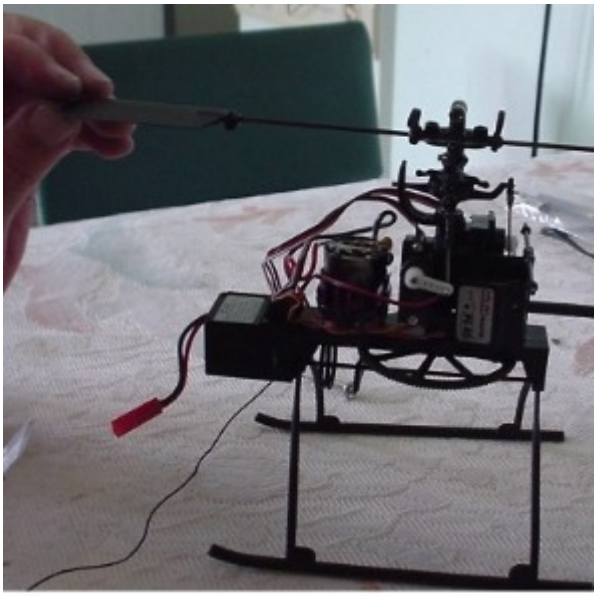

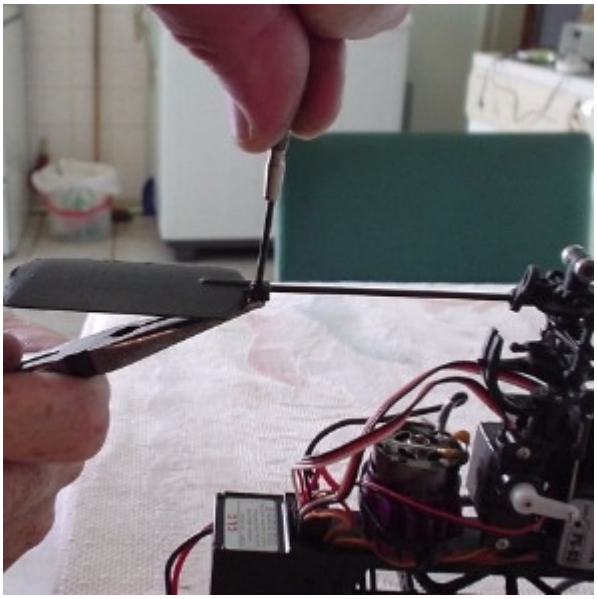

Loosen the Fly bar Blades and align the 0° Horizontal, and tighten them again.

Balancing & Fitting the Main Blades

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Use two Flat bottom glasses, and put the Main Rotor Blades with head Assembly on the bottom

If the Blades hang to the one side,Use Electric Tape to balance the Blades.

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Slow cutoff and remove small pieces of tape and put the Blades back on the Glasses

Once the Blades hangs 100% horizontal, it's balanced and ready to connect to your Helicopter.

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Ready to Go

Once everything is checked and re-checked, you are ready to take your heli for a maiden light.

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Once again, check the Balance of the Heli (refer to: Adjust the Balances with the Battery) section on Balancing Tips.

Extend the Transmitter (Radio) antenna to full length and switch on the transmitter. **Please NOTE: Always make sure that the Channel 1 Throttle Position is set to 0%.**
Connect the Heli Battery to the Receiver and ESC units.

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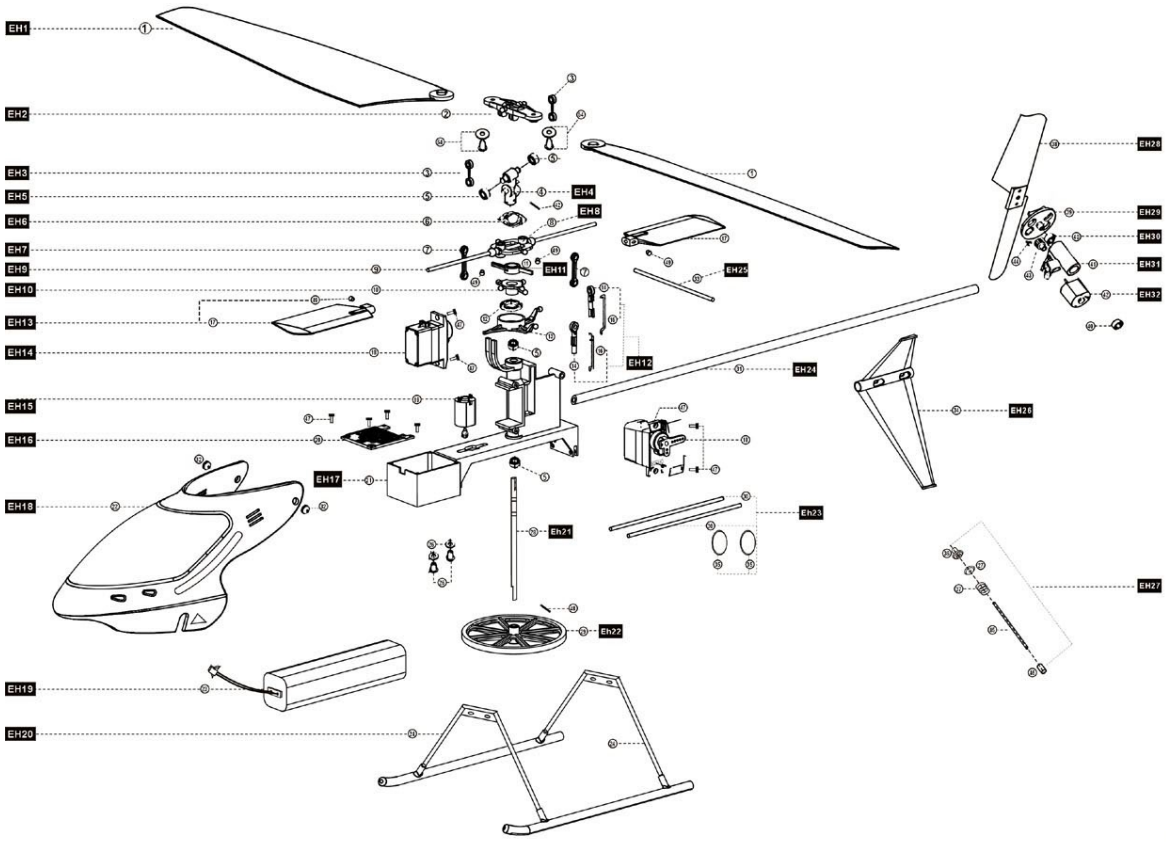
And there we go.... isn't this FUN!!!!!!

9 Explosion Drawing



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10 Individual Spares/Part List

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No	Part No	Description	Image
1	EH 1	Main Motor	
2	EH 2	Rotor Head	
3	EH 3	Double Hole Tie Bar (Short)	
4	EH 4	Rotary Sleeve Spindle	
5	EH 5	3 x 6 x 2.5 mm Main Rotor Ball Bearings (4) 2 x Rotor Head	

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No	Part No	Description	Image
6	EH 6	Internal Control Panel	
7	EH 7	Double Hole Tie Bar (Long)	
8	EH 8	External Control Panel	
9	EH 9	Stabilizing Wing Beam	
10	EH 10	Internal Tilting Pan	

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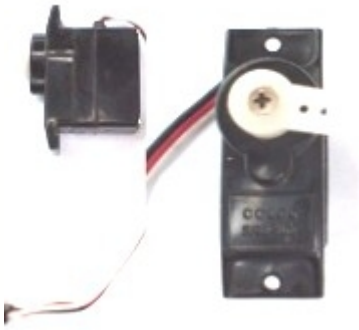
No	Part No	Description	Image
11	EH 11	Single Hole Tie Bar	
12	EH 12	Servo Hole Tie Bar	
13	EH 13	Stabilizing Blades	
14		Servo	
15	EH 15	Main rotor Motor Kit	

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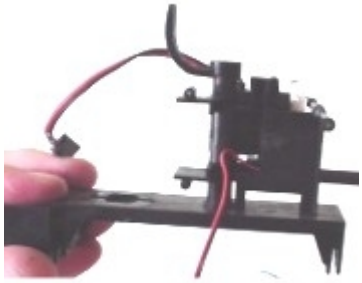
No	Part No	Description	Image
16	EH 16	PCB Box Lid	
17	EH 17	Framework	
18	EH 18	Casing(Canopy)	
19	EH 19	Battery	
20	EH 20	Foot Pole Support	

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No	Part No	Description	Image
21	EH 21	Main Shaft	
22	EH 22	Driving Wheel Gear	
23	EH 23	Battery Holder	
24	EH 24	Casing Pole Support	
25	EH 25	Foot Pole Support	

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No	Part No	Description	Image
26	EH 26	Tail Stabling Wing	
27	EH 27	Tail Fastening Sleeve spindle	
28	EH 28	Tail Rotor	
29	EH 24	Tail Rotor Gear Wheel	
30	EH 30	2 x 6 x 2 mm Tail Rotor Ball Bearing	

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No	Part No	Description	Image
31	EH 31	Tail Holder	
32	EH 32	Tail Motor Motor Kit	
33	EH 33	R144 IDF Receiver	
34	EH 45	CLC (II) Electron Timing	
34	EH 46	PG-03 Gyro	

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No	Part No	Description	Image
36	EH 49	Training Frame	
37	EH 50	Tail Rotor Motor Give Out Cove	
38	EH 51	Main Rotor Motor Give Out Cove	

11 PP Joy

This document describes how to install PPJoy on a new system. If you are installing PPJoy on Windows 2000 or XP, please make sure that:
You are logged in as Administrator or another user with Administrative privileges on the local machine.

Your system allows the installation of unsigned drivers. See Changing the Driver Signing settings for more details.
First extract the contents of PPJoySetup.zip to a temporary folder. Double-click **Setup.exe** to start the installation. After the installation is done you can delete the files from this temporary folder. [If you are using WinZip or a similar utility you may be able to simply double-click on the downloaded .zip file and click on YES/OK to run Setup.]

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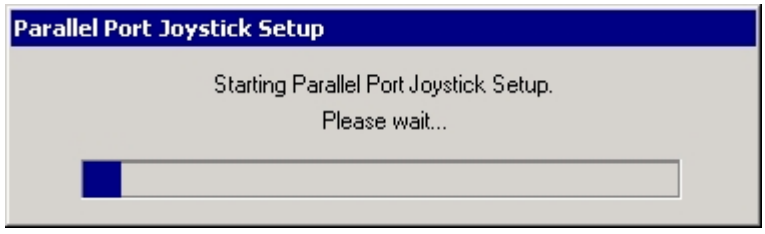


Please wait while the PPJoy installation prepares itself. It should only take a few seconds.

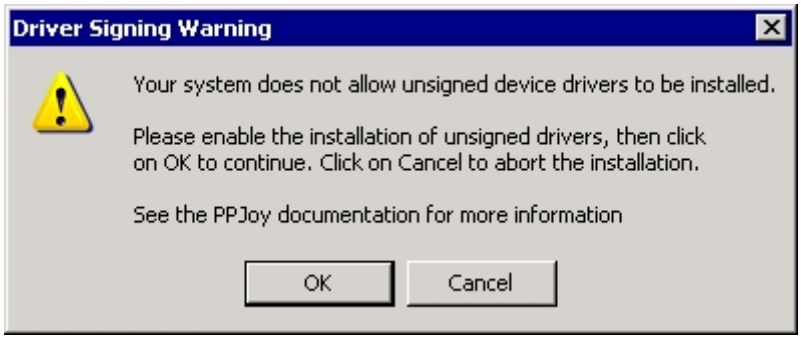
This installer was created using the Shareware Developer version of Installer VISE™ from MindVision Software.
For licensing information, contact:
MindVision Software
sales@mindvision.com
http://www.mindvision.com
If you need technical support with the product being installed, contact the shareware developer NOT MindVision Software.
Copyright © 1993-2000 MindVision Software. All rights reserved worldwide.
Use of this software to distribute commercial software is strictly prohibited. Please report violations to MindVision.
Click on this dialog to continue...

The installer for PPJoy was created using Installer VISE from Mind Vision Software. For more information on Installer VISE, contact:

Mind Vision Software
5901 North 58th Street
Lincoln, NE 68507

Voice: (402) 323-6600
Fax: (402) 323-6611
E-mail: mindvision@mindvision.com
http://www.mindvision.com

If you are a shareware or freeware author you may use their installer free of charge to distribute your products.
Press any key or click on the Dialog to continue


Driver Signing Warning
Your system does not allow unsigned device drivers to be installed.
Please enable the installation of unsigned drivers, then click on OK to continue. Click on Cancel to abort the installation.
See the PPJoy documentation for more information
OK
Cancel

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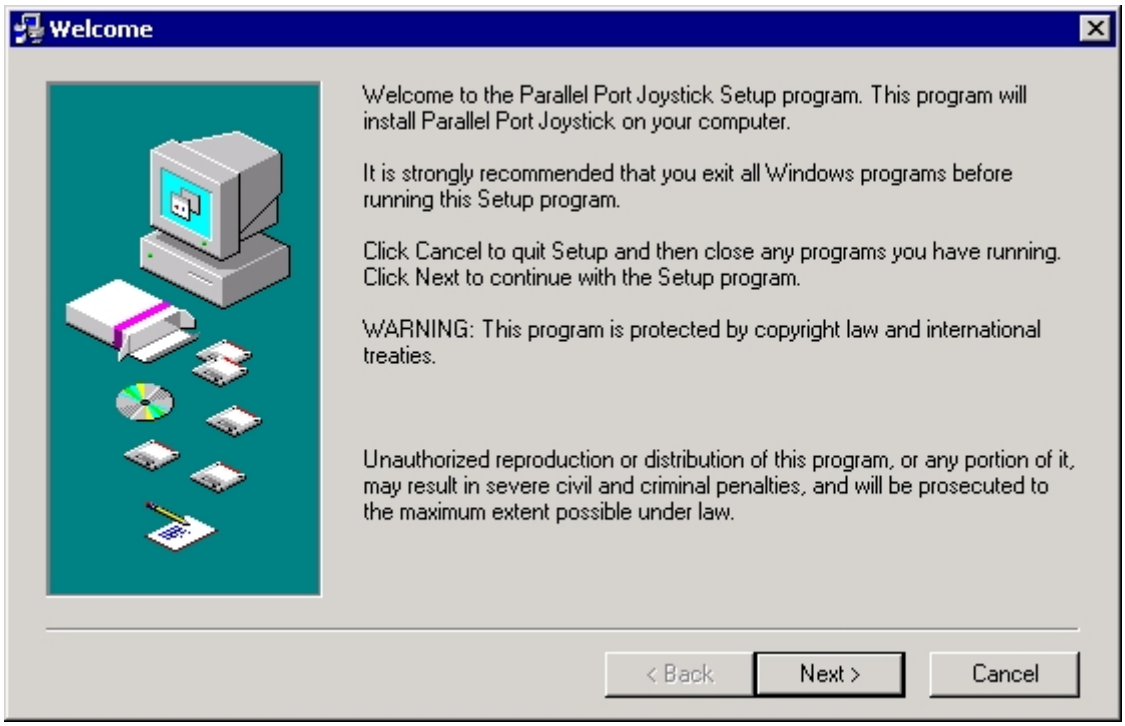
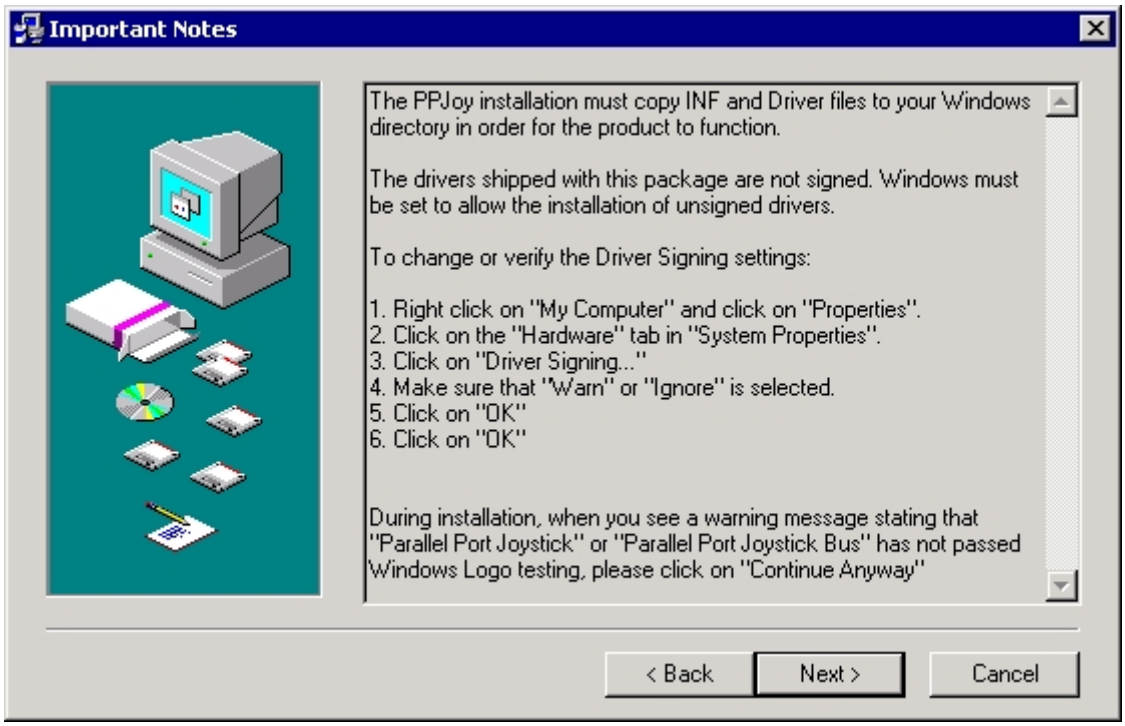
If you get this warning it means that the PPJoy setup application thinks your computer will not allow the installation of unsigned drivers. Please see the section Changing the Driver Signing settings for details. If you are sure your settings are correct, then press **OK** to continue with the installation. If you press **Cancel** the installation will stop.


Welcome
Welcome to the Parallel Port Joystick Setup program. This program will install Parallel Port Joystick on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup program.
Click Cancel to quit Setup and then close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
< Back
Next >
Cancel

Click on **Next**.


Important Notes
The PPJoy installation must copy INF and Driver files to your Windows directory in order for the product to function.
The drivers shipped with this package are not signed. Windows must be set to allow the installation of unsigned drivers.
To change or verify the Driver Signing settings:
1. Right click on "My Computer" and click on "Properties".
2. Click on the "Hardware" tab in "System Properties".
3. Click on "Driver Signing..."
4. Make sure that "Warn" or "Ignore" is selected.
5. Click on "OK"
6. Click on "OK"
During installation, when you see a warning message stating that "Parallel Port Joystick" or "Parallel Port Joystick Bus" has not passed Windows Logo testing, please click on "Continue Anyway"
< Back
Next >
Cancel

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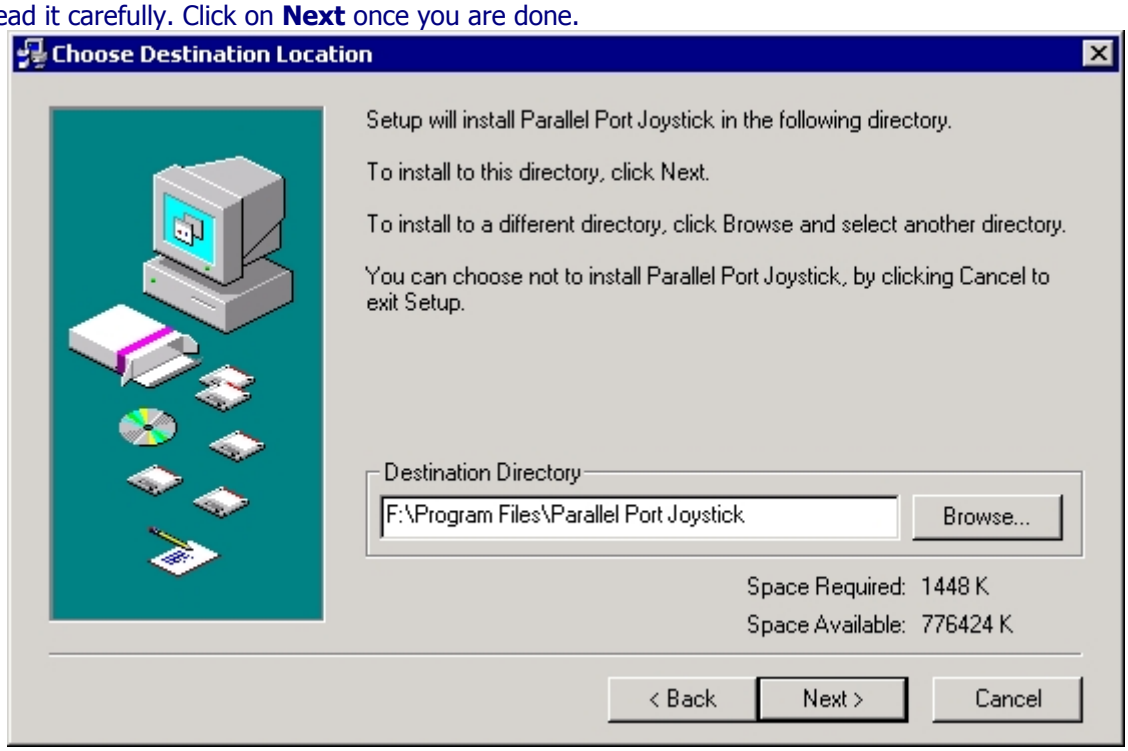
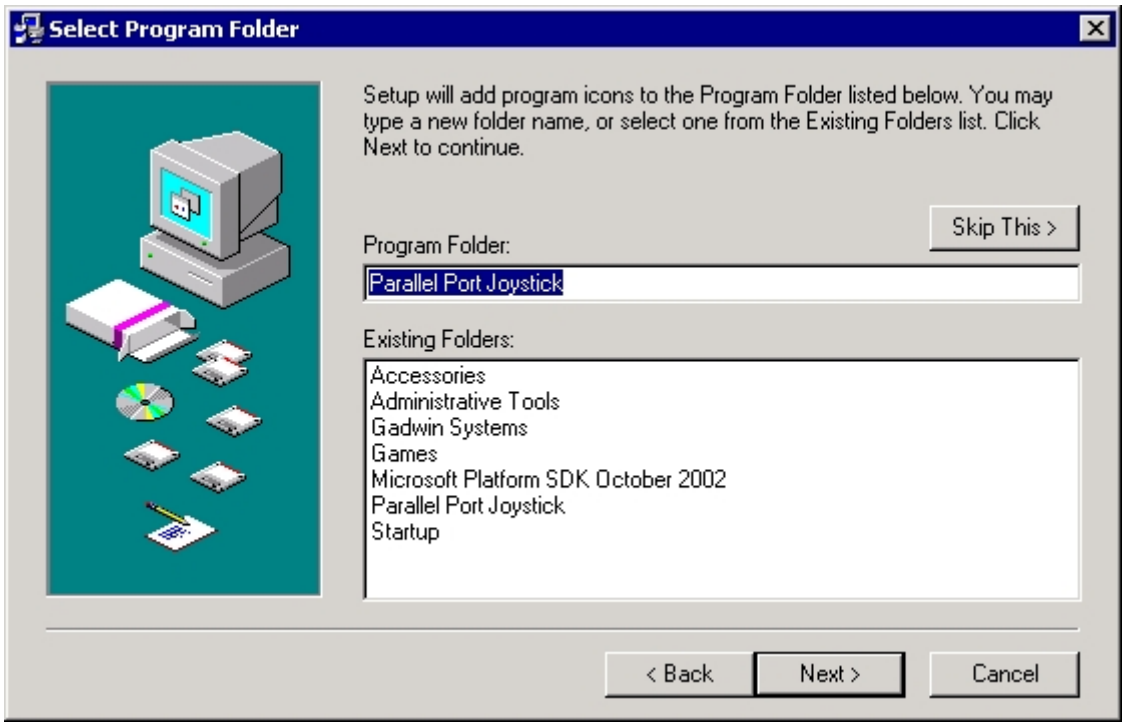
This screen may contain important information in addition to the PPJoy documentation. Please read it carefully. Click on **Next** once you are done.


Choose Destination Location
Setup will install Parallel Port Joystick in the following directory.
To install to this directory, click Next.
To install to a different directory, click Browse and select another directory.
You can choose not to install Parallel Port Joystick, by clicking Cancel to exit Setup.
Destination Directory
F:\Program Files\Parallel Port Joystick
Browse...
Space Required: 1448 K
Space Available: 776424 K
< Back
Next >
Cancel

This screen allows you to choose an installation directory for PPJoy. This is where the PPJoy documentation and source driver files will be kept. Accept the default location (recommended) or choose a new directory. Click on **Next**.


Select Program Folder
Setup will add program icons to the Program Folder listed below. You may type a new folder name, or select one from the Existing Folders list. Click Next to continue.
Skip This >
Program Folder:
Parallel Port Joystick
Existing Folders:
Accessories
Administrative Tools
Gadwin Systems
Games
Microsoft Platform SDK October 2002
Parallel Port Joystick
Startup
< Back
Next >
Cancel

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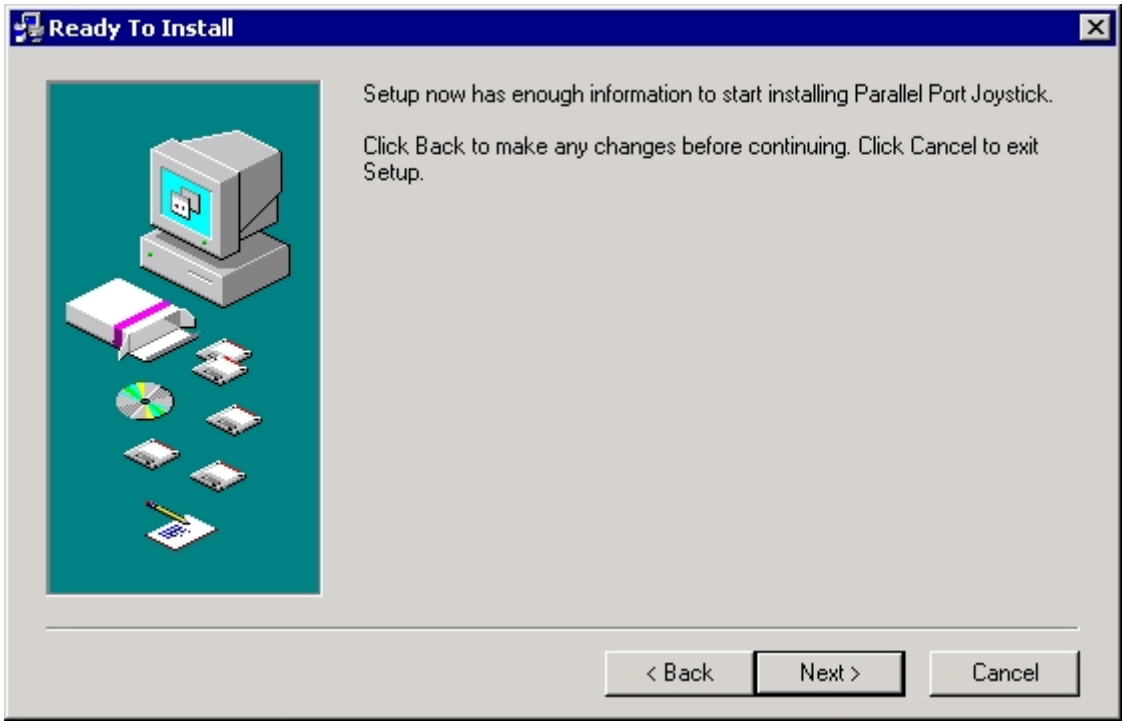
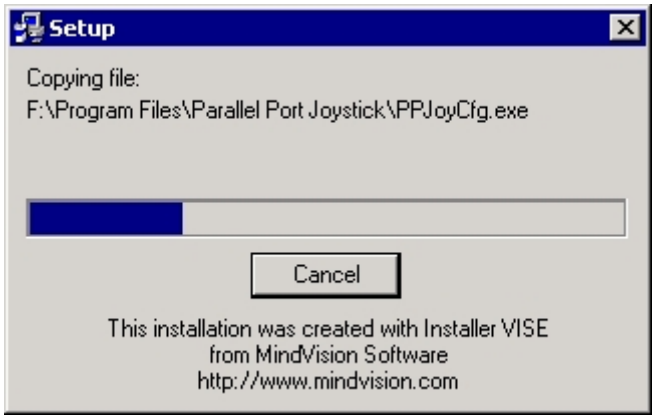
This screen allows you to select the Program Folder on the Start Menu where the PPJoy files will be installed. Accept the default folder (recommended) or choose a new folder. Click on **Next**.


Ready To Install
Setup now has enough information to start installing Parallel Port Joystick.
Click Back to make any changes before continuing. Click Cancel to exit Setup.
< Back
Next >
Cancel

This screen confirms that setup is ready to start the PPJoy installation. Click on **Next**.



This dialog shows the installation progress. During this process Windows 2000 or Windows XP may show Unsigned Driver warning messages. Please click on **Yes** (Windows 2000) or **Continue Anyway** (Windows XP) when these warning are shown.

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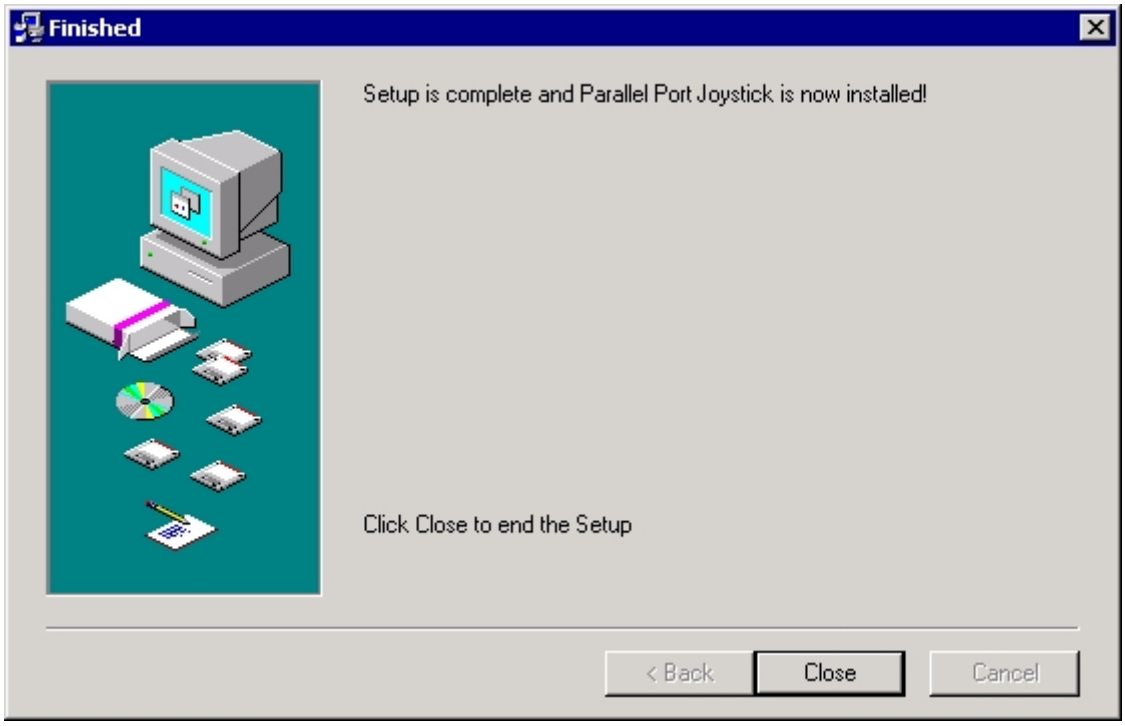

The PPJoy setup is complete. Press **Close** to finish setup.

Changing the Driver Signing

Windows 2000 and XP have a new feature that controls the installation of unsigned device drivers. There are three settings for Driver Signing:

- **Block**: This will prevent the installation of unsigned drivers.
- **Warn**: This will prompt the user whether to install an unsigned device driver or not.
- **Ignore**: The system will install unsigned drivers without prompting the user.

The PPJoy device drivers are unsigned and you will need to set your system to **Warn** or **Ignore**. The rest of this document describes how to do that. [Unsigned device drivers are drivers that are not certified and digitally signed by Microsoft

.

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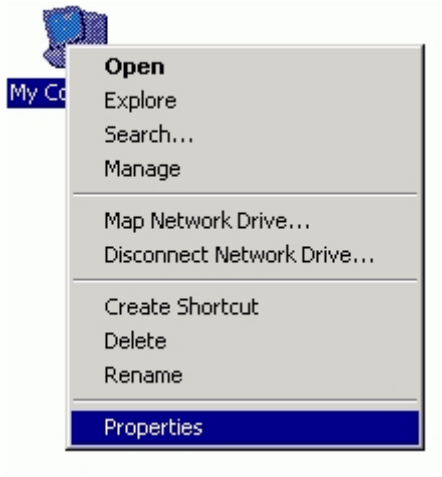
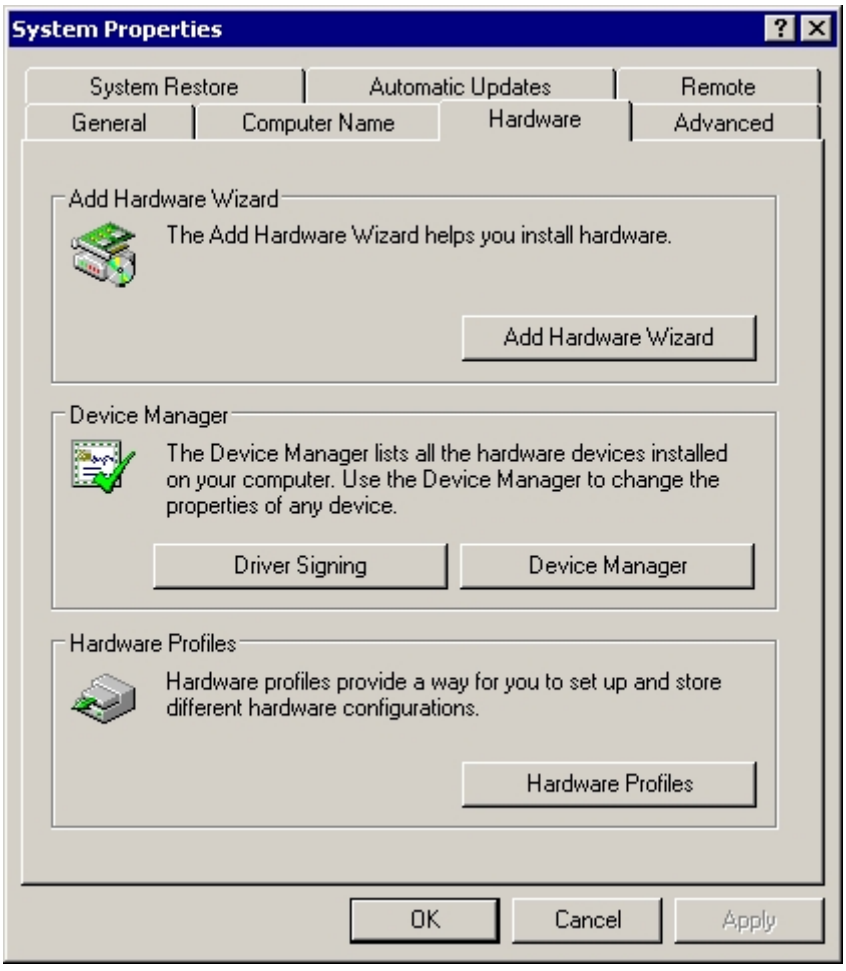


They may impair your system performance. It is up to you to decide if you want to take the risk or not.]
First, locate the **My Computer** icon on the desktop or in Windows Explorer. Right-click on the **My Computer** icon and select **Properties**.



Windows XP

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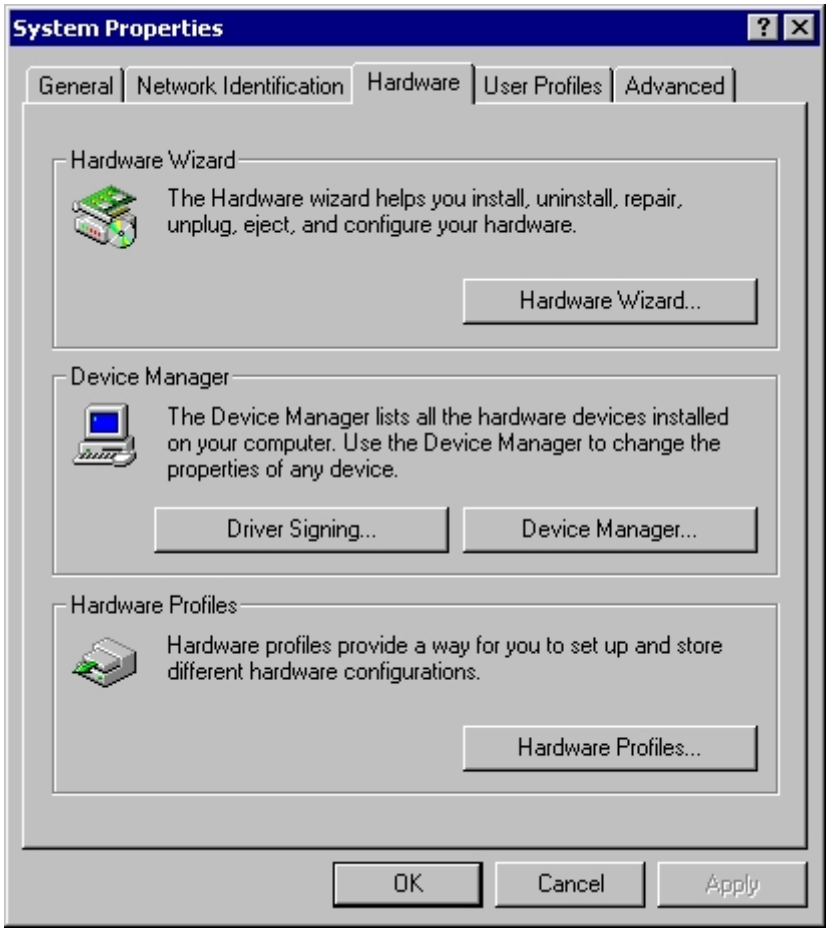
System Properties
General
Network Identification
Hardware
User Profiles
Advanced
Hardware Wizard
The Hardware wizard helps you install, uninstall, repair, unplug, eject, and configure your hardware.
Hardware Wizard...
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Driver Signing...
Device Manager...
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles...
OK
Cancel
Apply

Windows 2000

After clicking on the **Hardware** tab your screen should look like one of the two screens shown above. Now click on **Driver Signing**.

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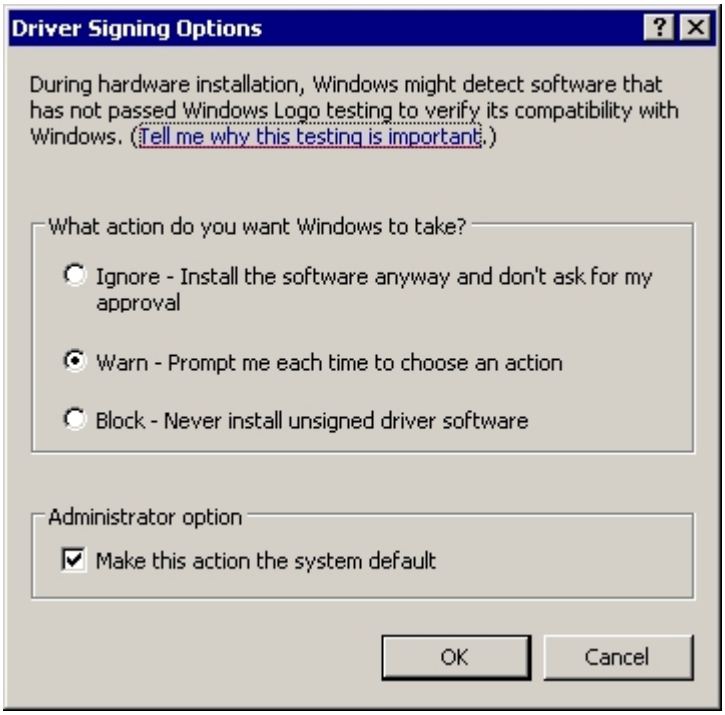
Driver Signing Options
During hardware installation, Windows might detect software that has not passed Windows Logo testing to verify its compatibility with Windows. (Tell me why this testing is important.)
What action do you want Windows to take?
Ignore - Install the software anyway and don't ask for my approval
Warn - Prompt me each time to choose an action
Block - Never install unsigned driver software
Administrator option
Make this action the system default
OK
Cancel

Make sure that either **Warn** or **Ignore** is selected. Then click on **OK**.

Opening the PP Joy Application Applet

This document describes how to open the PPJoy Control Panel applet. The PPJoy applet is used to add and remove joysticks that are plugged into the Parallel Port.

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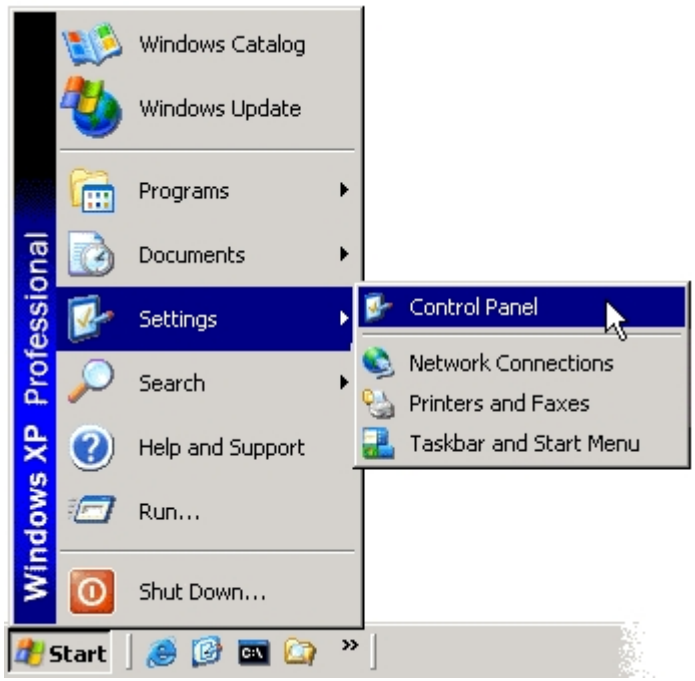
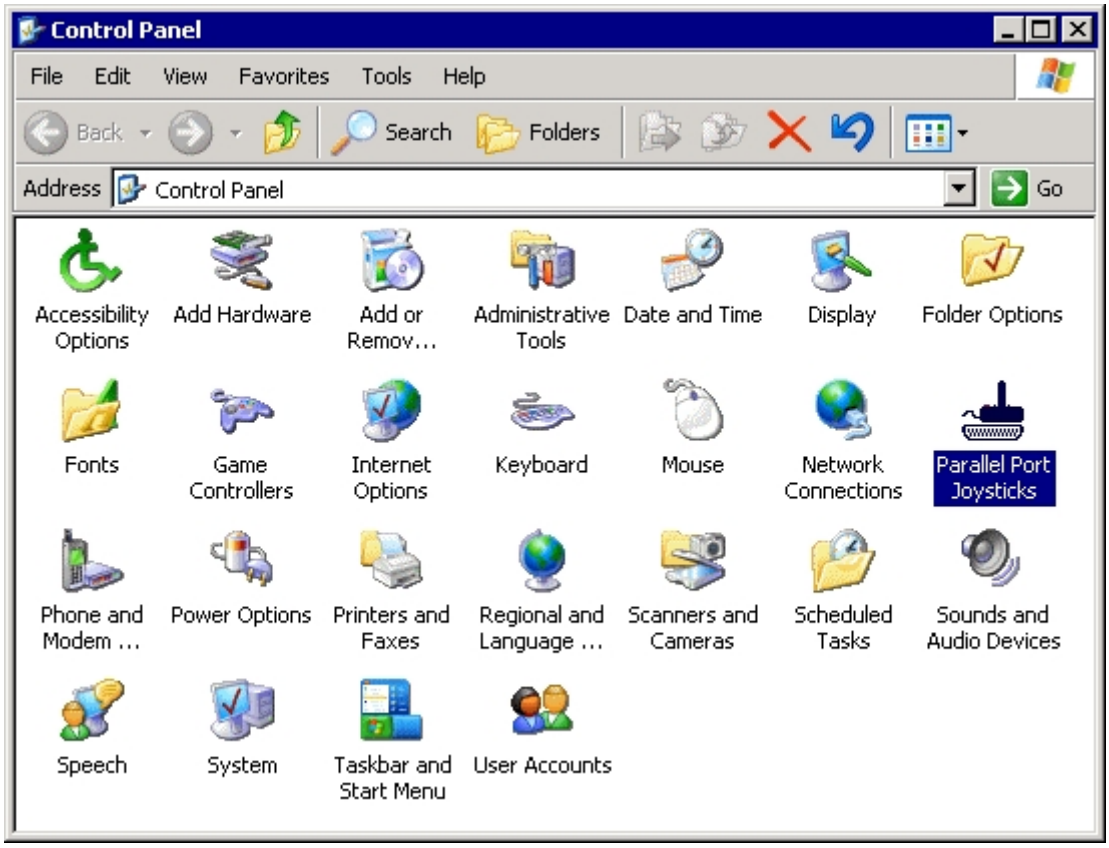


First, click **Start** on the Taskbar, then **Settings** and finally on **Control Panel**. This will open the Control Panel.



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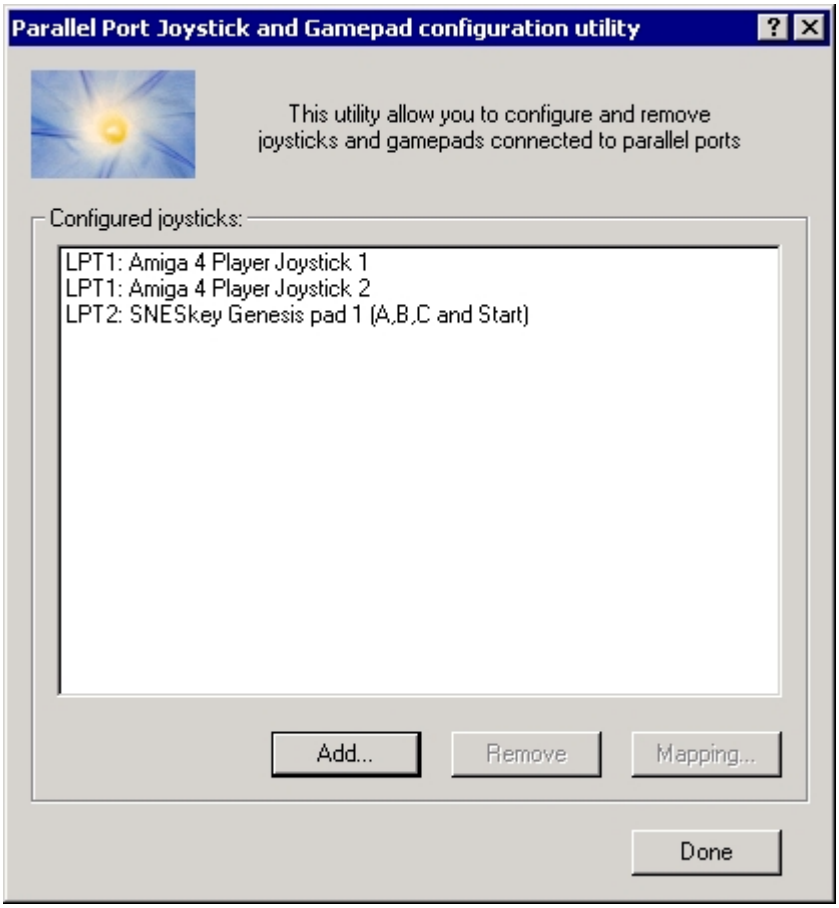
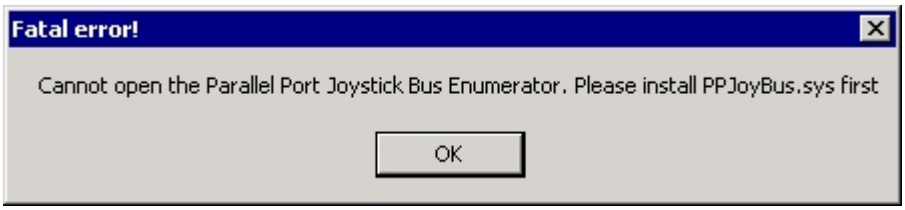
In Control Panel, double-click on the **Parallel Port Joysticks** icon (shown highlighted). This will open the PPJoy Control Panel applet.


Parallel Port Joystick and Gamepad configuration utility
This utility allow you to configure and remove joysticks and gamepads connected to parallel ports
Configured joysticks:
LPT1: Amiga 4 Player Joystick 1
LPT1: Amiga 4 Player Joystick 2
LPT2: SNESkey Genesis pad 1 (A,B,C and Start)
Add...
Remove
Mapping...
Done

This is the main PPJoy applet window. From this screen you will add and remove joysticks that are connected to the Parallel Port. Joysticks that connect to the Game port or USB will not show up here.



If you get this error message, instead of the PPJoy applet, you need to make sure that PPJoyBus.sys is installed.
Under Windows 98/Me you need to install it yourself (see Windows 98 Post-Install actions). Under Windows 2000/XP you need to make sure your settings allow the installation of unsigned drivers (see Driver signing for more information) and re-install the software.

Getting the Thunderbird Radio to Work with

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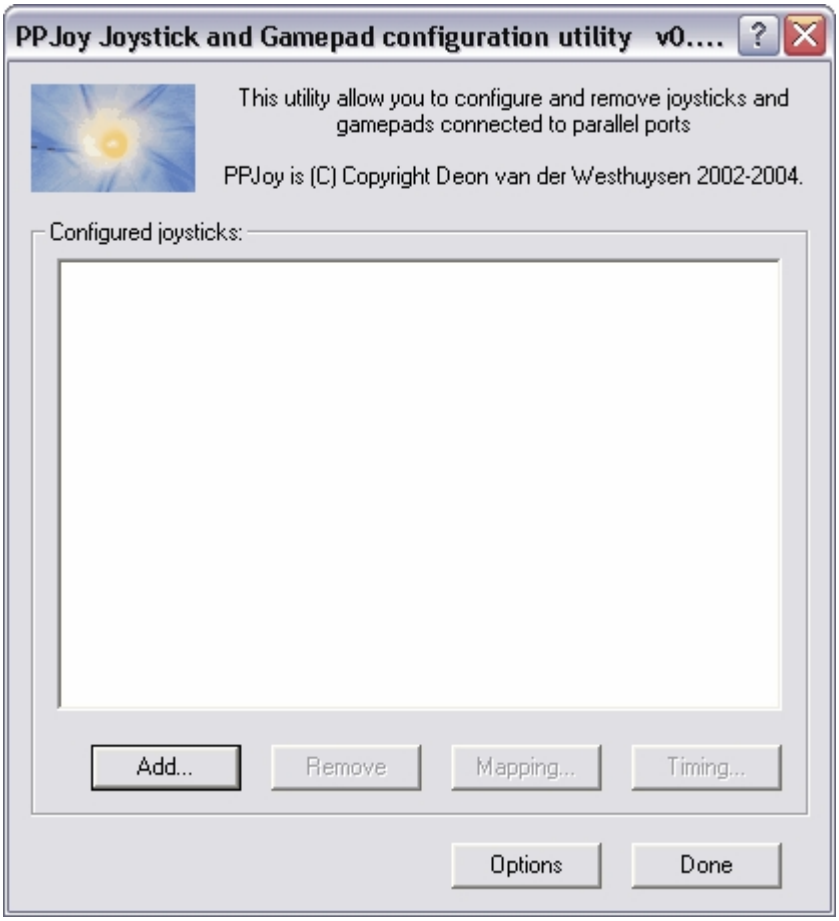
FMS

Follow the Instructions on How to Install PP Joy.

Plug the Serial Interface Received with your Heli into a Free Serial port on your Computer. DO NOT PLUG IT INTO THE RADIO (TX) YET!!!

Go to Start, Control Panel, Parallel Port Joysticks.



Click on ADD

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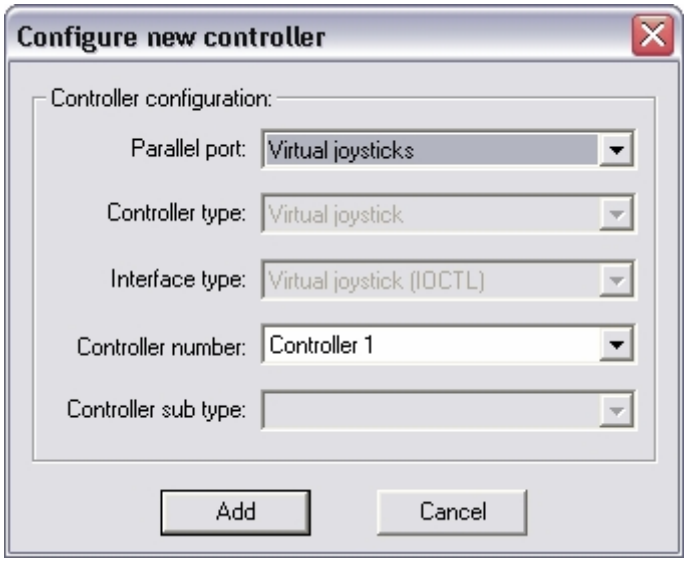

Select at the Parallel Port Drop Dow, Virtual Joysticks and Press ADD, and the DONE

Your Operating System will Install the Necessary Software for the Virtual Joystick.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
Parallel Port Joystick 1
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Continue Installation until Done.

When Complete with the Driver Installation go to Start, Programs, Parallel Port Joystick and PPJOYCOM, to Execute the Com Driver for the Joystick.

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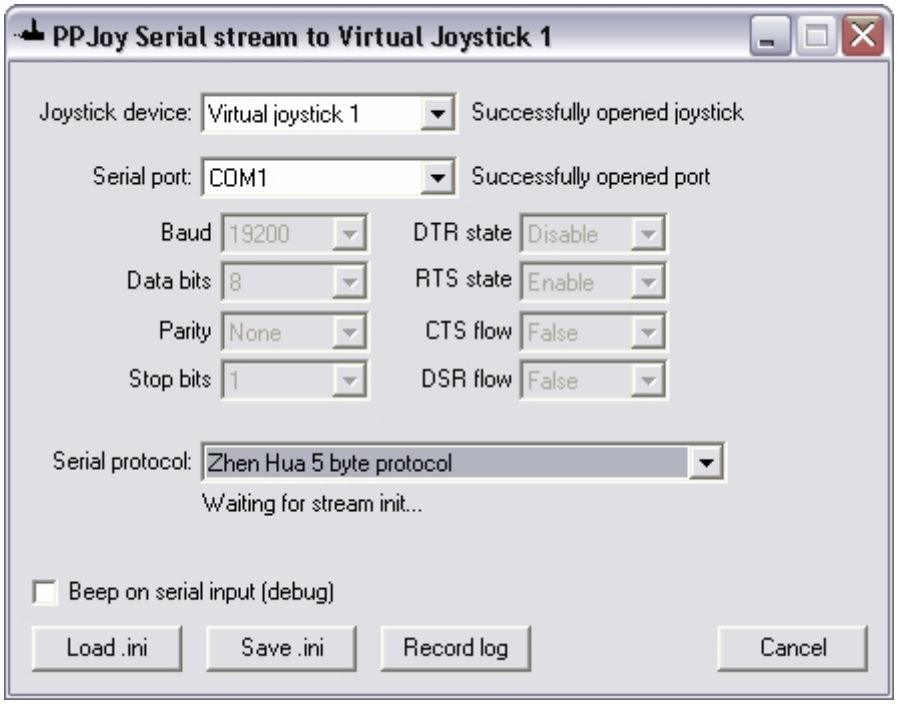

Select the Serial Port, and Select THEN HUA 5 BYTE PROTOCOL at the Serial Protocol Drop down.

Note the Message "Waiting for Stream Init..."

Plug the Connector into your Radio TX. Do not Switch the Radio ON.

NOTE: The Message will change to Read Serial Stream... if the connection is successful. If not, remove the Cable and try a Different COM port.

Minimize the PPJOYCOM Window and Start FMS. (NOTE: This window must be active to allow the Radio TX to work with FMS.)

Once in FMS, go to Control Panel, and Select Joystick Interface, and Click on Mapping/Calibration.

The Default setup should look like the Image Below

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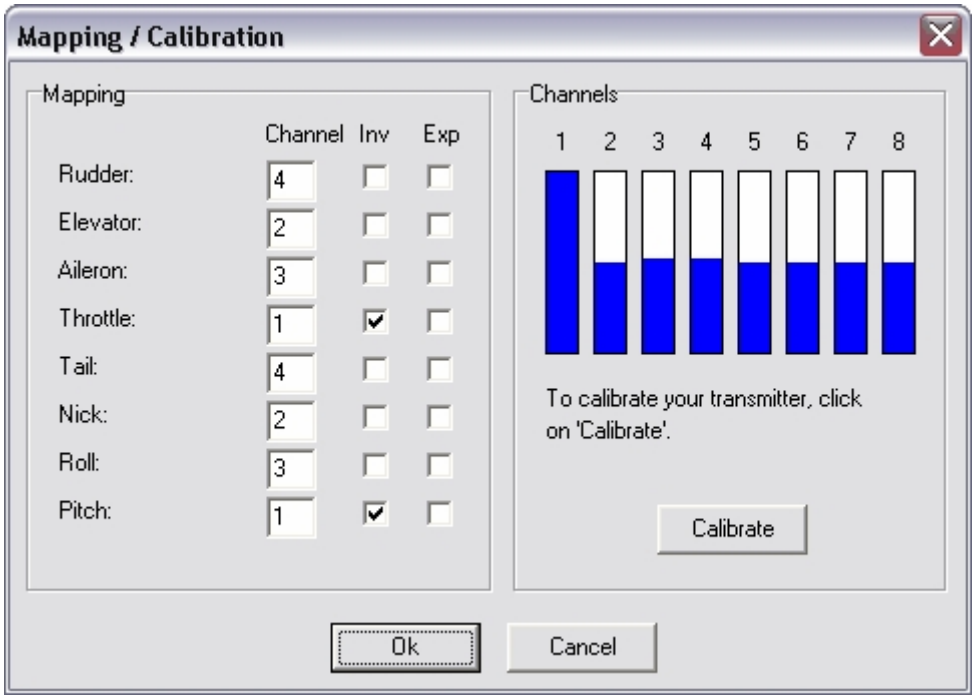

Remember to Calibrate you TX before lying attempts. Press the OK Button.

You are ready to fly the Heli on FMS.

Enjoy.

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